(EPA) has developed a 303(d) list for each state that identifies specific pollutants causing impairment of specific receiving waters. A water quality planning tool, including 303(d) list information, has been developed for Caltrans and is available at www.stormwater.water-programs.com. Projects discharging to receiving waters with TMDLs may have to comply with additional discharge criteria. Response to TMDL criteria should be coordinated with the District/Regional NPDES Storm Water Coordinator.

2.3.2.3 Standard Urban Storm Water Mitigation Plans

Projects in urban areas may be subject to additional water quality requirements or additional BMP requirements if there is an applicable SUSMP. These plans contain special local requirements and are currently applicable in Los Angeles and Ventura counties; however, other urban areas may develop SUSMPs in the future.

2.3.3 Storm Water Documents

The Storm Water Quality Assessment (SWQA) and the Storm Water Data Report (SWDR) are the two project-specific Storm Water Documents prepared by a District. The District Environmental Branch prepares the SWQA, while the Project Engineer (PE) prepares the SWDR. These documents are prepared concurrently, and require extensive coordination between the PE, the Environmental staff person preparing the SWQA, and the District/Regional NPDES Storm Water Coordinator.

A Storm Water Quality Assessment (SWQA) will identify applicable storm water regulations and storm water impacts to be mitigated. The SWQA also identifies the receiving water, evaluates the existing surface water quality, identifies potential project-related storm water discharges, and evaluates the potential project-related storm water impacts on the receiving water quality. The SWQA is typically prepared by the Environmental Unit as support documentation during the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) environmental review phase of a project. For detailed information regarding the preparation of the SWQA, refer to the SWQA Guidance Document, Volume 5 of the Caltrans Standard Environmental Reference (web site http://www.dot.ca.gov/ser). In the absence of an SWQA, the designer will need to obtain individual water quality requirements from the District/Regional NPDES Storm Water Coordinator.

The SWDR is a form of documentation that enables the PE to provide key project information to environmental personnel responsible for preparing the SWQA, and also responsible for assessing water quality impacts as a result of the proposed project. The preliminary information in the SWDR prepared during the PID phase will be reviewed, updated, and confirmed by environmental personnel, and in turn, be provided to designers to revise the SWDR during the PA/ED phase. The information contained in the SWDR and the SWQA may be used to make more informed decisions regarding the selection of BMPs.

2.3.4 Types of Pollutants

Selection of BMPs requires an understanding of the types of pollutants that the BMPs are designed to remove. Brief descriptions of commonly encountered pollutants are provided in the following sub-sections.

Table 2-2 provides a list of theses pollutants and the types of Treatment BMPs that can be used to reduce the discharge of these pollutants. To determine if the BMP addresses pollutants of concerns and will meet pollution control requirements, use Section 15 of the *BMP Retrofit Pilot Project Final Report* (California Department of Transportation, January 2004) and other pertinent information, and consult with your District NPDES Coordinator.

Table 2-2: Pollutants of Concern and Applicable Treatment BMPs

	Biofiltration Systems	Infiltration Basin	Detention Devices	Dry Weather Flow Diversions[1]	Gross Solids Removal Devices	Multi-Chambered Treatment Train	Media Filters	Wet Basins	Traction Sand Traps
Total Suspended Solids	✓	✓	✓	✓		✓	✓	✓	✓
Nutrients		✓		✓				✓ [2]	
Pesticides		✓		✓					
Particulate Metals	✓	✓	✓	✓		✓	✓	✓	
Dissolved Metals		✓		✓			✓		
Pathogens		✓		✓				✓	
Litter	✓	✓	✓	✓	✓	✓	✓	✓	
Biochemical Oxygen Demand		✓		✓				✓	
Total Dissolved Solids		✓		✓					

[1] Dry Weather Flow Diversions address nonstorm water flows only.

[2] Reductions observed for dry weather flow only.

2.3.4.1 Total Suspended Solids

Solids can be present in the water column in a dissolved phase (Total Dissolved Solids [TDS]) or a suspended phase (Total Suspended Solids [TSS]). In general, suspended solids are considered a pollutant when they significantly exceed natural concentrations and have a detrimental effect on the beneficial uses designated for the receiving water.

Possible sources of TSS from Caltrans facilities include natural erosion, runoff from construction sites, and other operations where the surface of the ground is disturbed. In addition, increased runoff from new impervious surfaces can accelerate the process of channel erosion, which in turn can increase TSS (and TDS) in runoff.

2.3.4.2 Nutrients

Excessive inputs of nutrients such as phosphorus and nitrogen to receiving waters can over-stimulate the growth of aquatic plants to the detriment of other aquatic life and to some beneficial uses of the receiving water. Nutrients generally have more adverse effects in water bodies with slow flushing rates, such as slow moving streams and lakes. Also, nutrients attached to suspended solids in storm water runoff can cause problems where they settle out downstream.

Sources of phosphorus that may be present in highway runoff include tree leaves, surfactants and emulsifiers, and natural sources such as the mineralized organic matter in soils. Phosphorus may be present in storm water discharges as dissolved or particulate orthophosphate, polyphosphate, or organic phosphorous.

Potential sources of nitrogen in highway runoff include atmospheric fallout, nitrite discharges from automobile exhausts, fertilizer runoff, and natural sources such as mineralized soil organic matter. Nitrogen may be present in storm water discharges as nitrate, nitrite, ammonia/ammonium, or organic nitrogen.

2.3.4.3 Pesticides

A pesticide is a chemical agent designed to control pest organisms. The most common forms of pesticides are organic chemicals designed to target insects (insecticides) or vascular plants (herbicides). Pesticides have been repeatedly detected in surface waters and precipitation in the United States. Water is one of the primary media in which pesticides are transported from targeted applications to other parts of the environment. As the use of pesticides has increased, concerns about the potential adverse effects of pesticides on the environment and human health have also increased.

2.3.4.4 Metals (Particulate and Dissolved)

Metals in storm water runoff may be in a dissolved phase or a particulate form adsorbed to suspended solids. Some Treatment BMPs are effective for removing specific particulate metals, but not for removing dissolved metals. If there are special requirements to remove dissolved metals (e.g., to address a TMDL or other site-specific requirement), then the designer should contact the District/Regional NPDES Storm Water Coordinator to identify the appropriate BMP

requirements. Metals in the particulate phase may be removed through sedimentation or biofiltration.

Possible sources of metals in highway runoff include the combustion products from fossil fuels, the wearing of brake pads, and the corrosion of metals, paints and solder. Metals can also reach receiving waters through the natural weathering of rock and soil erosion.

2.3.4.5 Pathogens

Pathogenic microorganisms including viruses, bacteria, protozoa, and helminth worms are of concern in storm water runoff. The direct measurement of specific pathogens in water is extremely difficult. For that reason, the coliform group of organisms is commonly used as an indicator of the potential presence of pathogens of fecal origin.

Sources of total and fecal coliforms in storm water runoff are ubiquitous (e.g., soil particles, droppings of wild and domestic animals, etc.). Human sources could include illicit sewer connections and seepage from septic tanks.

2.3.4.6 Litter

Litter in storm water is defined as manufactured objects made from paper, plastic, cardboard, glass, metal, etc. This definition does not include materials of natural origin such as gravel or vegetation. Litter is quantified by 24-hour air-dried volume and weight measurements. Litter within storm water is considered to be a significant problem in the municipal areas of Southern California as evidenced by the current listing of 38 water bodies as impaired due to trash on the EPA 303(d) list. Litter in surface waters can inhibit the growth of aquatic vegetation, harm aquatic organisms by ingestion or entanglement, convey other pollutants, such as toxic substances, and cause aesthetic problems on shorelines.

2.3.4.7 Biochemical Oxygen Demand

The Biochemical Oxygen Demand (BOD) is a measure of quantity of oxygen required to biologically stabilize the organic matter present in a pollutant. Biochemical oxidation is a slow process, and theoretically takes an infinite time to reach 100% completion. Therefore, a 5-day BOD (BOD_5) test, wherein the oxidation reaches about 60 to 70% completion, is commonly used for practical purposes. The BOD_5 test measures the rate of oxygen required by microorganisms (i.e., a laboratory inoculation) to oxidize the biodegradable matter in a sample under controlled laboratory test conditions. High BOD values (usually the result of organic contamination) suggest that the dissolved oxygen levels in receiving water may be depleted.

2.3.4.8 Total Dissolved Solids

The TDS in water consist of inorganic and organic molecules and ions that are in solution. Elevated levels of dissolved solids can deleteriously affect surface water quality in a number of ways, most often because of the increased concentration (and perhaps increased number) of constituents that may be toxic to aquatic organisms.

2.4 BEST MANAGEMENT PRACTICES

BMPs are technology-based requirements in the federal storm water regulations that call for the implementation of controls to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP) in municipal-type storm water systems. Caltrans drainage facilities are considered a municipal separate storm sewer system under the Caltrans permit and are, therefore, held to the MEP requirement. For construction projects that disturb areas of 0.4 hectares (1 acre) or more, the technology-based requirements include the use of Best Conventional Technology (BCT) and Best Available Technology (BAT).

As used in this document, the term BMP refers to operational activities or physical controls that are applied to reduce the discharge of pollutants and minimize potential impacts upon receiving waters. Accordingly, the term BMP refers to both structural and nonstructural controls that have direct effects on the release, transport or discharge of pollutants.

Four categories of BMPs (Design Pollution Prevention, Treatment, Construction Site, and Maintenance) are described in Table 2-3. Design Pollution Prevention BMPs, Treatment BMPs and Construction Site BMPs are discussed in further detail in Sections 2.4.1 through 2.4.3 of this document.

Table 2-3: BMP Descriptions

BMP	Description
Design Pollution Prevention BMPs	Preservation of existing vegetation, concentrated flow conveyance, slope/surface protection, etc.
Treatment BMPs	Permanent treatment devices and facilities.
Construction Site BMPs	Temporary soil stabilization and sediment control, non-storm water management, and waste management. Refer to the Construction Site BMP Manual.
Maintenance BMPs	Litter pickup, waste management, street sweeping, etc.

Designers should consider BMPs throughout the development of their project. Design Pollution Prevention and Treatment BMPs should be selected and designed to minimize life-cycle maintenance costs and resources. Adequate site access and maximum worker safety should be considered for maintenance of Design Pollution Prevention and Treatment BMPs. Construction Site BMPs should be considered when estimating the cost of a project so that adequate cost is projected and enough funding is allocated. Maintenance BMPs are related to typical maintenance activities and equipment, but are not otherwise discussed within this document. In addition to the above BMP categories, the designer must also be aware of, and address, non-storm water discharges associated with a project, such as pumping stations, tunnel washing, etc. The designer should coordinate with the District/Regional NPDES Storm Water Coordinator.

2.4.1 Design Pollution Prevention BMPs

Design Pollution Prevention BMPs are permanent measures to improve storm water quality (e.g., reduce erosion, manage non-storm water discharges, etc.) after construction is completed. The Design Pollution Prevention BMPs that are to be incorporated, as appropriate, into the design of new facilities and reconstruction or expansion of existing facilities are listed in Table 2-4. Design guidelines for Design Pollution Prevention BMPs are included in Appendix A.

Table 2-4: Design Pollution Prevention BMPs

Consideration of Downstream Effects Related to Potentially Increased Flow
Preservation of Existing Vegetation
Concentrated Flow Conveyance Systems
Ditches, Berms, Dikes and Swales
Overside Drains
Flared Culvert End Sections
Outlet Protection/Velocity Dissipation Devices
Slope/Surface Protection Systems
Vegetated Surfaces
Hard Surfaces

For all Caltrans projects, Caltrans will maximize vegetation-covered soil areas of a project.

A flow chart illustrating the Design Pollution Prevention BMP selection process for projects is shown in Figure 2-2.

2.4.2 Treatment Best Management Practices

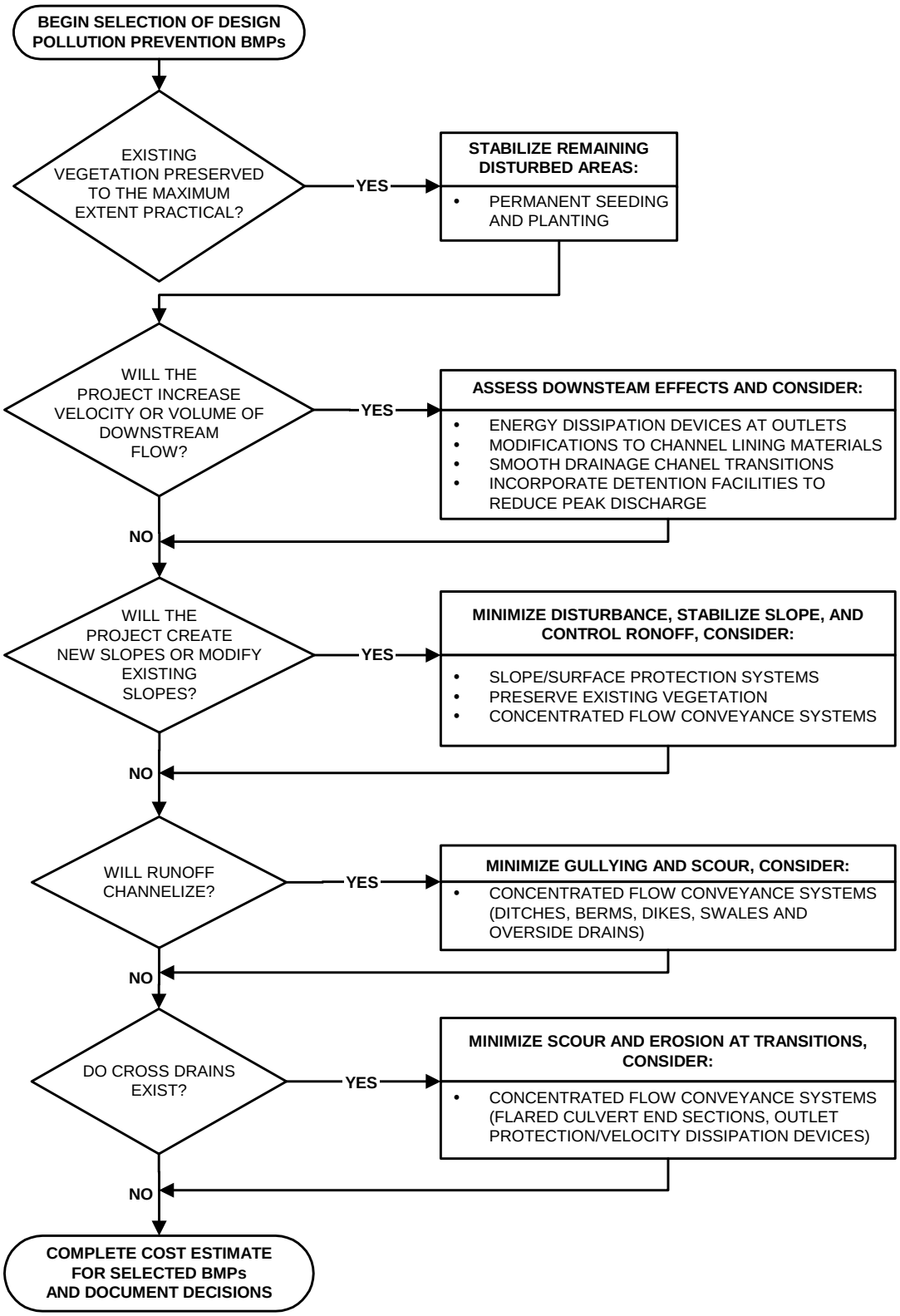
The Treatment BMPs listed in Table 2-5 will be considered for all projects identified pursuant to Section 4 of this PPDG. These BMPs have been approved for statewide use. Appendix B provides a general description and design guidelines for the approved Treatment BMPs. Appendix E includes an Evaluation Documentation Form for Treatment BMPs that designers are to use to determine if a project is required to consider incorporating Treatment BMPs (see discussion of evaluation process in Section 4).

Table 2-5: Approved Treatment BMPs

Biofiltration: Strips/Swales
Infiltration Devices
Detention Devices
Traction Sand Traps
Dry Weather Flow Diversion
Gross Solids Removal Devices (GSRDs)
Media Filters
Multi-Chamber Treatment Train
Wet Basins

A flowchart illustrating the Treatment BMP selection process for projects required to consider Treatment BMPs is shown in Figure 2-3 and in Figure 2-3(D7) for those projects in District 7. Designers are encouraged to consider combining approved BMPs (e.g., overflow from a detention basin may be discharged to a bioswale or an infiltration basin could be preceded by a traction sand trap). These considerations shall be utilized at all phases of the project delivery process (PID, PAED, and PSE).

Figure 2-2: Decision Process for Selecting Design Pollution Prevention BMPs



Biofiltration strips and swales are vegetated surfaces that remove pollutants by filtration through grass, sedimentation, sorption to soil or grass, and infiltration through the soil. Strips and swales are mainly effective at removing debris and solid particles, although some constituents are removed by sorption to the soil. Biofiltration swales are vegetated channels that receive directed flow and convey storm water. Biofiltration strips, also known as vegetated buffer strips, are vegetated sections of land over which storm water flows as overland sheet flow.

Biofiltration strips and swales are to be implemented at all sites to the extent that implementation is consistent with existing Caltrans policies, as described herein. In practice, this means maximizing the use of vegetation in the right-of-way wherever site conditions and climate allow vegetation to establish and where flow velocities are not high enough to cause scour.

Infiltration devices store runoff and allow it to infiltrate into the ground. Infiltration prevents pollutants in the captured runoff from reaching surface waters. In areas of high sediment loads, pretreatment may be required. Infiltration devices are required to meet the criteria in Appendix B. Infiltration devices should be considered wherever site conditions allow and the design water quality volume exceeds 123 cubic meters (0.1 acre-foot).

Detention devices are basins or tanks that temporarily detain runoff under quiescent conditions to allow particles to settle out. Detention devices should be considered when the design water quality volume is at least 123 cubic meters (0.1 acre-foot).

Traction sand traps should be considered at sites where traction sand or other traction-enhancing substances are commonly applied (at least once or twice a year) to the roadway.

Dry weather flow diversions to treat non-storm water flow may be feasible. They should only be considered if dry weather flow from Caltrans activities is persistent, or the result of an ongoing Caltrans activity. Additionally, dry weather diversions should only be considered if connection to a nearby sanitary sewer would not involve excessive measures to implement, and provided the local health department and the sanitary sewer authority are willing to allow the Department to connect to a nearby sanitary sewer.

Gross Solids Removal Devices (GSRDs) should be considered for areas where receiving waters are on the 303(d) list for trash or areas where TMDLs that require trash removal have been adopted.

Media Filters remove fine sediment, particulate-associated pollutants, and sometimes dissolved pollutants. The normal configuration of such a device consists of an initial sedimentation basin or vault followed by a filtering vault that is lined with a media.

Multi-Chamber Treatment Trains (MCTT) use three treatment mechanisms in three different chambers. These include a catch basin with a sump, a sedimentation chamber with tube settlers and sorbent pads, and a filtering chamber lined with media.

Wet Basins (constructed wetlands) are permanent pools of water designed to mimic naturally occurring wetlands. The main distinction between construction and natural wetlands is that constructed wetlands are placed in upland areas and are not subject to wetland protection regulations.

Wet basins should be considered when the site is located in a location where the visual aesthetics of the permanent pool is considered a benefit (such as a roadside rest area or vista point). Site must have a high water table or other source of water must be present to provide base flow sufficient to maintain the plant community year-round.

Total wet basin volume shall be at least four times the water quality volume. Permanent pool volume shall have a 3:1 permanent pool to water quality volume ratio, and an additional temporary storage capacity greater than or equal to the water quality volume. For wet basins to be considered, the design water quality volume must exceed 123 cubic meters (0.1 acre-foot). The sizing of this treatment BMP is based on Water Quality Volume (WQV). The WQV is determined by the 85th percentile runoff capture ratio. This method is described in the *Urban Runoff Management WEF Manual of Practice* No. 23, 1998 (WEF and ASCE, 1998).

2.4.2.1 Site-Specific Determination of Feasibility

General criteria used during the evaluation of Treatment BMPs include relative effectiveness, technical feasibility, costs and benefits, and legal and institutional constraints.

Relative Effectiveness: A recommended BMP should generally demonstrate equal or greater pollution control benefits than a design without any BMP. Effectiveness may be assessed in terms of specific pollutants of concern. For further information, see Section 15 of the *BMP Retrofit Pilot Project Final Report*, California Department of Transportation, January 2004, and consult with your District NPDES Coordinator.

Technical Feasibility: A recommended BMP must be technically feasible. Caltrans must be able to implement the BMP within the context of the state highway system. Feasibility also includes health and safety concerns. BMPs that substantially increase the risk to Caltrans workers or the public will be considered not feasible.

Costs and Benefits: The pollution control benefits must have a reasonable relationship to the costs. The costs and benefits analysis will consider the impacts to the receiving waters that are being reduced or eliminated through implementing the BMP.

Legal and Institutional Constraints: The recommended BMP cannot compromise Caltrans compliance with other laws. For example, Caltrans must provide drainage under roadways at regular intervals to prevent water from accumulating up-gradient and threatening the integrity of the roadbed and to limit encroachment of captured water on the traveled way. Caltrans cannot legally block historic drainage patterns or systems (e.g., runoff from farmland).

Feasibility Assessment: The first step in assessing the feasibility of incorporating a potential BMP into a project is to gather the data needed to both determine the size and to estimate the cost of that specific BMP. In addition, it should be determined whether the site characteristics, particularly the soil characteristics, are appropriate (checklists are provided in Appendix E for this purpose).

The second step is to determine the Water Quality Volume (WQV) that must be treated. (See Section 2.4.2.2 for guidance.)

Next, for all BMPs except GSRDs and traction sand traps, calculate the size of the proposed BMP needed to treat the water quality volume (or flow). Use the procedures defined in Appendix B under Infiltration Basins and Detention Basins to evaluate the appropriate BMP, giving proper consideration to recovery zones, setbacks from structures, hydraulic head, and maintenance access roads and ramps. In very small drainage areas, it may be impractical to construct a BMP to treat the resulting small WQV (or flow). For projects where the WQV for a specific BMP is less than 123 cubic meters (m^3) (0.1 acre-foot), infiltration devices and detention devices are not cost effective, and should not be considered further.

For siting and evaluation criteria for all of the approved treatment BMPs, see Appendix B.

During the planning and design process, multiple project alternatives may be evaluated. If a project requires the consideration of Treatment BMPs, yet the preferred alternative cannot incorporate Treatment BMPs, then the designer should re-evaluate the other alternatives that may provide greater opportunities for incorporating Treatment BMPs and reducing impacts to receiving waters. This consideration of project alternatives shall be documented in the Storm Water Data Report. If it is ultimately found not feasible to incorporate Treatment BMPs within the project, then the designer shall document the reasons in a technical report submitted to the RWQCB. This technical report must be submitted at a minimum of 30 days prior to advertisement of the project.

Sites requiring extraordinary plumbing to collect and treat runoff (e.g., jacking operations under a highway, bridge deck collection systems, etc.) are considered infeasible due to their associated costs and need not be considered. Sites requiring extraordinary features or construction practices, such as retaining walls and shoring, may also be infeasible due to their associated costs relative to the cost of the BMP itself. Extraordinary plumbing, features, or construction practices should be brought to the attention of the District/Regional NPDES Storm Water Coordinator for consideration on a project-by-project basis.

If a BMP is too large to fit at a site, several options should be considered: (1) cooperation with another jurisdiction contributing drainage to obtain sufficient additional space; (2) purchase of additional land; and (3) installing a BMP that is smaller than what normal sizing procedures would dictate, if agreeable to the RWQCB. Again, these are issues to be brought to the attention of the District/Regional NPDES Storm Water Coordinator so that decisions can be made on a project-by-project basis.

2.4.2.2 Treatment BMP Use and Placement Considerations

Several factors must be considered to determine which BMPs are suitable for a given application. Site-specific conditions can affect operations, maintenance, construction costs, safety and aesthetics. The designer must determine if sufficient right-of-way is available for the desired BMP, or if the benefits associated with a potential BMP justify the consideration of acquiring additional right-of-way.

The physical dimensions of a BMP may have an important bearing on the factors identified in this section. The size of many BMPs is determined by the amount of runoff the system will be required to treat. The amount of runoff is affected by the location, land use, drainage area, storm

Figure 2-3: Decision Process for Selecting Treatment BMPs at Specific Sites (not District 7)

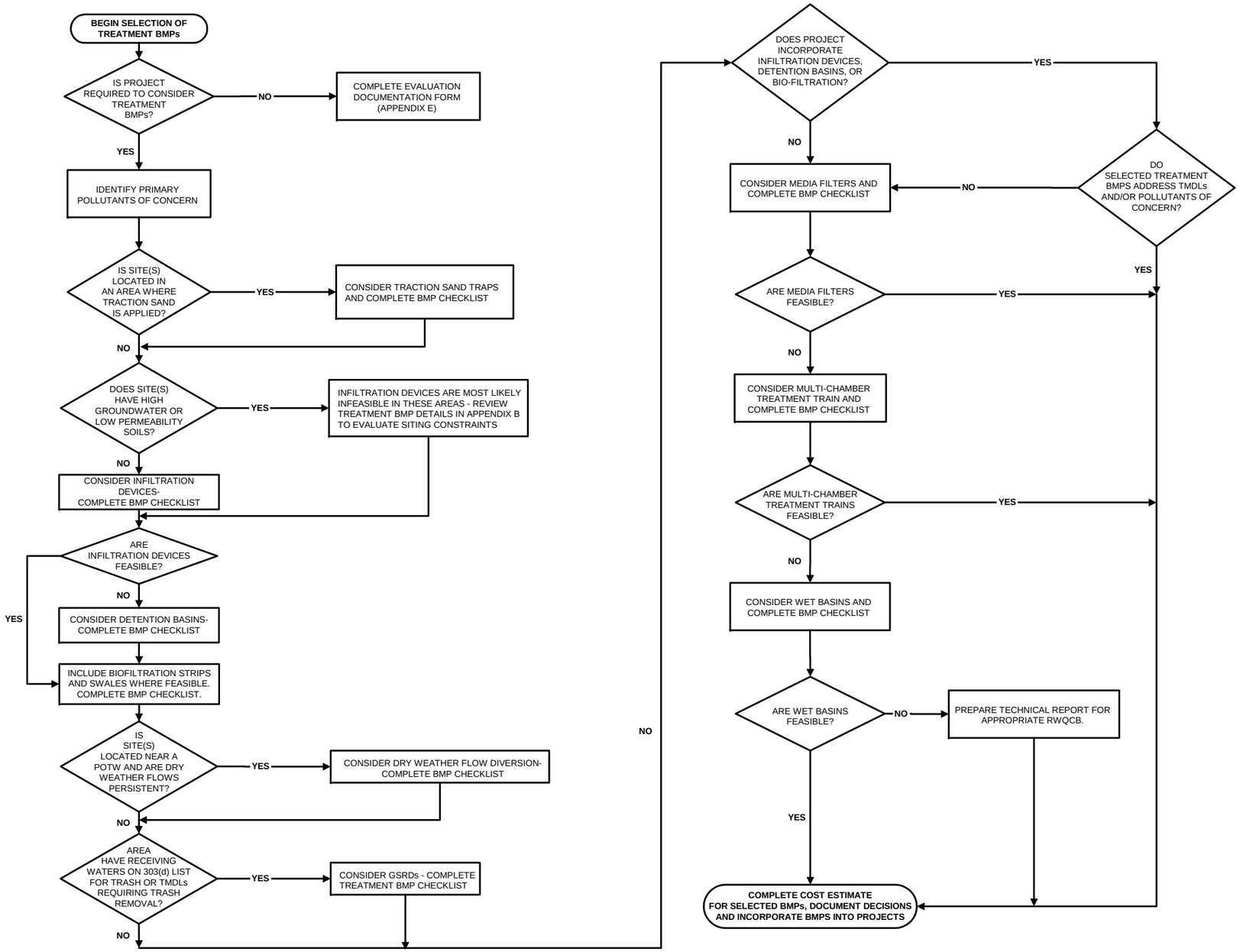
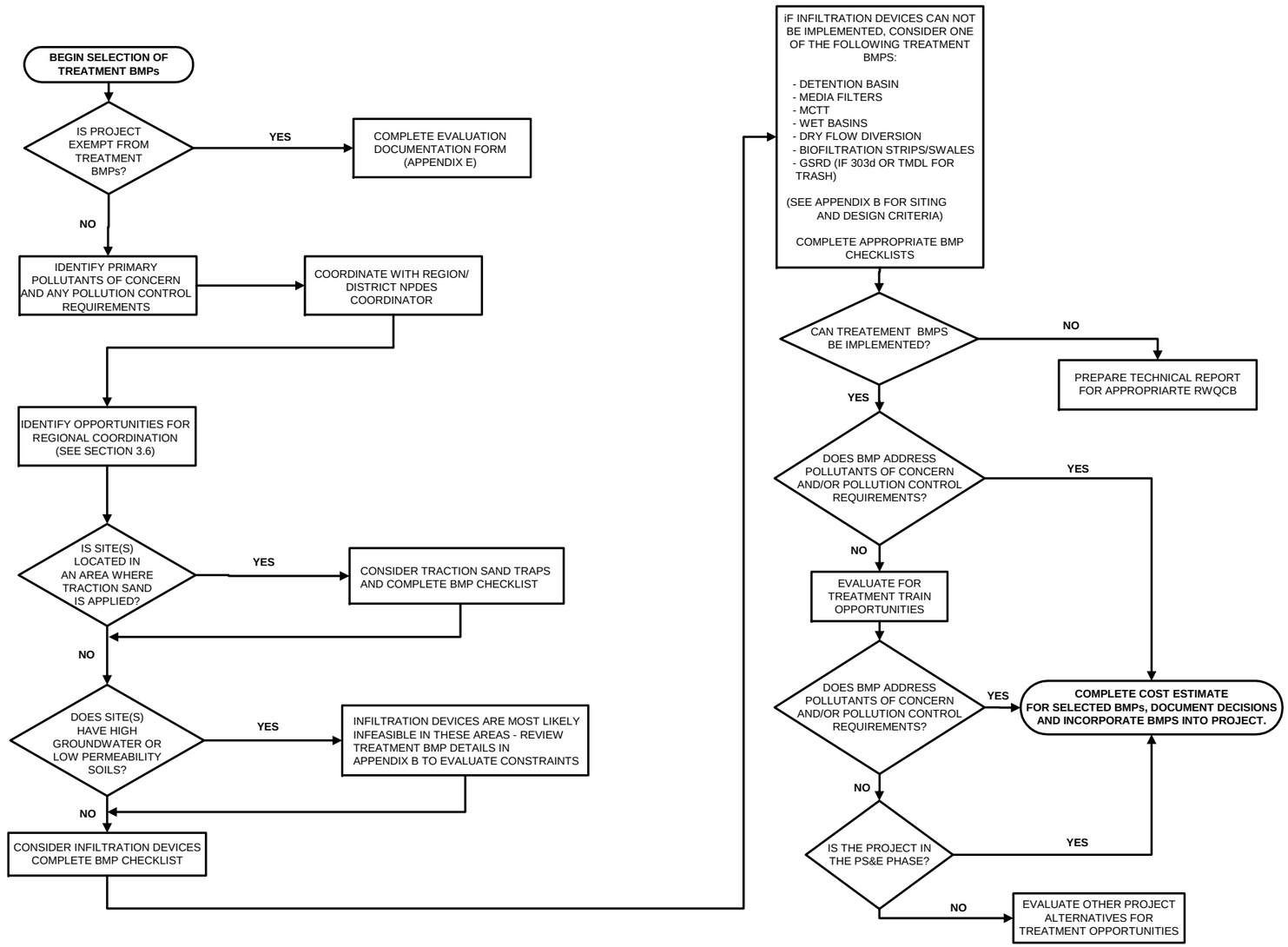


Figure 2-3 (D7): Decision Process for Selecting Treatment BMPs at Specific Sites in District 7.



intensity, topography, soil characteristics and the extent of impervious areas. For the design of infiltration or detention basins, the District's hydraulics staff should be consulted.

Both storm volume and peak flow conditions must be considered in the evaluation of runoff conditions. The "Design Storm" is the particular event that generates runoff rates or volumes that the drainage facilities are designed to handle. Unlike flood control measures that are typically designed to store or convey the peak volumes or flows of infrequent storm events, Treatment BMPs are designed to treat the lower volume or flow of more frequent storm events. The volume or flows associated with the frequent events are commonly referred to as the WQV for BMPs designed based on volume, and Water Quality Flow (WQF) for BMPs designed based on flow. Treatment BMPs are sized to accommodate the WQF or WQV from the contributing drainage area. Flows in excess of these values are diverted around or through the treatment BMP. Methods for determining the WQV are generally tied to an analysis of rainfall depths generated over 24-hour periods.

The WQV of Treatment BMPs is based on using any one of the following methods:

- Where they are established, sizing criteria from the RWQCB or local agency (whichever is more stringent) will be used; and
- Where the RWQCB or local agency does not have an established sizing criterion, Caltrans will use one of the following methods:
  - Option 1: The maximized detention volume determined by the 85th percentile runoff capture ratio. This method is described in Chapter 5 of the *Urban Runoff Management WEF Manual of Practice No. 23,* 1998, published jointly by the Water Environment Federation (WEF) and the American Society of Civil Engineers (ASCE). Designers should note, however, that the information presented in the WEF manual cannot be directly applied to Caltrans facilities because it is based on large watersheds and oversimplified hydrologic data for California. This method requires the designer to assume a drawdown time. Any drawdown time between 24 and 72 hours can be used (the 24-hour limit provides adequate settling and the 72-hour maximum addresses vector concerns). A design tool (Basin Sizer) that uses data from more than 700 California rainfall stations, has been created for Caltrans use. It is available at http://stormwater.water-programs.com. A detailed description of the method can also be found in: Guo, C.Y., and B.R. Urbonas (1996), "Maximized Detention Volume Determined by Runoff Capture Ratio," *Journal of Water Resources Planning and Management*, v. 122, n. 1, pp. 33-39.
  - Option 2: The volume of annual runoff based on unit basin storage WQV to achieve 80 percent or more volume of treatment based on the sizing methods provided in the *California Storm Water Municipal Best Management Practice Handbooks,* published by the California Storm Water Quality Task Force, March 1993. This method requires the assumption of a 40-hour drawdown time. A design tool has been created for Caltrans use. It is available at http://stormwater.water-programs.com.

Alternatively, a WQV may be established by Caltrans subject to the review and approval of the RWQCB if one of the following situations applies:

- The site area is limited and cannot accommodate a Treatment BMP sized according to the methods described in Options 1 or 2; or
- Sizing a Treatment BMP using Options 1 or 2 in areas of the State with significant annual precipitation results in excessively large treatment units.

The WQF is the primary design criteria used for various types of filtration treatment control devices under development. Caltrans, the SWRCB and the nine RWQCBs worked cooperatively to establish these values.

The following WQFs negotiated with the SWRCB and RWQCBs should be used as the basis for designing the approved filtration-type treatment BMPs. Where there are special circumstances or conditions, the PE, the District/Regional NPDES Storm Water Coordinator and the related RWQCB should discuss the potential need for modification of the criteria on a case-by-case basis.

In addition to designing for the WQF, the designer must also insure that the filtration treatment device includes a bypass or an overflow device to convey peak discharges from larger design storms consistent with Section 861.3 of the Highway Design Manual.

The listed values of rainfall intensity would be used in the Rational Formula (Q=CiA) to estimate runoff from areas that would discharge flow to the filtration treatment device. The resulting runoff rate would be the design WQF to be used at any specific site.

1. Region 1 (North Coast) – 0.56 centimeters/hour (cm/hr) (0.22 inches/hour ["/hr]) for Siskiyou and Modoc Counties, 0.69 cm/hr (0.27 "/hr) for Trinity and Mendocino Counties and 0.91 cm/hr (0.36 "/hr) for Del Norte, Humboldt and Sonoma Counties.
2. Region 2 (San Francisco) – 0.51 cm/hr (0.20 "/hr) regionwide.
3. Region 3 (Central Coast) – 0.56 cm/hr (0.22 "/hr) for Santa Cruz County, 0.51 cm/hr (0.20 "/hr) for Santa Clara County, 0.46 cm/hr (0.18 "/hr) for San Benito, Monterey and San Luis Obispo Counties and 0.66 cm/hr (0.26 "/hr) for Santa Barbara County.
4. Region 4 (Los Angeles) – 0.51 cm/hr (0.20 "/hr) regionwide.
5. Region 5 (Central Valley) – 0.41 cm/hr (0.16 "/hr) for portions of Lassen and Modoc Counties within the Region, all areas of Region below 305 meters (m) (1,000') elevation north of and including Sacramento and Amador Counties and below 610 m (2,000') elevation south of Sacramento and Amador Counties, and all elevations on the west side of the Region (rain shadow side of the Coast Range). 0.51 cm/hr (0.20 "/hr) for elevations in the Sierra Nevadas between 305 m (1,000') and 1,219 m (4,000') in the north and between 610 m (2,000') and 1,219 m (4,000') in the south. 0.61 cm/hr (0.24 "/hr) for all elevations above 1,219 m (4,000') in the Sierra Nevadas.
6. Region 6 (Lahontan) –

    a) Where there are location-specific requirements (Truckee River, East and West Forks Carson River, Mammoth Creek, and Lake Tahoe), the WQF will conform

to the Basin Plan requirement for runoff from impervious areas. Where runoff from pervious areas contributes to the flow to the treatment device, the WQF value to be used will be as specified in the following two items.

b) Other than as stated in item a), above, the WQF to be used for that portion of the Lahontan Region including Inyo County and areas southward will be 0.41 cm/hr (0.16 "/hr). The WQF to be used for pervious surface areas within the Mammoth Creek watershed above 2,133 m (7,000) feet will be 0.41 cm/hr (0.16 "/hr).

c) For all other areas of the Lahontan Region other than as indicated in item a) above, the WQF to be used will be 0.51 cm/hr (0.20 "/hr.) This includes pervious surface areas of the Truckee River, Carson River East and West Forks and Lake Tahoe Hydrologic units.

7. Region 7 (Colorado River) – 0.41 cm/hr (0.16 "/hr) regionwide.
8. Region 8 (Santa Ana River) –0.51 cm/hr (0.20 "/hr) regionwide.
9. Region 9 (San Diego) – 0.51 cm/hr (0.20 "/hr) regionwide.

2.4.3 Construction Site Best Management Practices

Construction Site BMPs are deployed during construction activities to reduce pollutants in storm water discharges. Table C-1 in Appendix C is a matrix of approved Construction Site BMPs. Additional information on design, placement, and applicability of Construction Site BMPs can also be found in Appendix C of this document, the Construction Site BMP manual, and Section 4 of the Guidelines.

2.4.4 Maintenance Best Management Practices

The Department currently stencils messages at storm drain inlets located at highway facilities such as park and ride lots, rest areas and vista points to assist in educating the public about storm water runoff pollution. Additionally, all new inlets located within cities, towns, and communities with populations of 10,000 or more, or within designated MS4 areas, shall be stenciled when constructed. Design Engineers should contact the District Maintenance Storm Water Coordinator to identify stencil types, specifications and details for projects falling within these areas.

4.1 INTRODUCTION AND OBJECTIVES

The Caltrans Statewide Storm Water Management Plan (SWMP) requires Project Development personnel to assess the need for storm water Best Management Practices (BMPs) and incorporate these BMPs as appropriate during the initial planning and design phases of all Caltrans projects. Design Pollution Prevention BMPs must be considered for every project. Additionally, every project must evaluate the need to address critical Construction Site BMPs and the maintainability of all permanent BMPs incorporated into the project. This section, however, focuses on evaluating whether a project must consider incorporating Treatment BMPs. If a project must consider incorporating Treatment BMPs, then site-by-site determination of Treatment BMP feasibility is required.

4.2 PROJECT EVALUATION PROCESS

The attached decision tree, Figure 4-1, provides general guidance to determine when a project is required to consider implementing Treatment BMPs. The corresponding Evaluation Documentation Form is included in Appendix E of this document. The information in the following sub-sections is intended to supplement the attached decision tree by providing further detailed descriptions of the steps in the decision tree. The numbers in the descriptions correspond to the steps in the decision tree.

Step 1 - Start

Caltrans construction projects require the consideration of Permanent Treatment BMPs. These projects are identified based upon certain criteria as shown in Figure 4-1. Designers should use Figure 4-1 and the Evaluation Documentation Form in Appendix E to determine if a specific project requires the consideration of Permanent Treatment BMPs.

Step 2 - Is the project a safety and/or an emergency project?

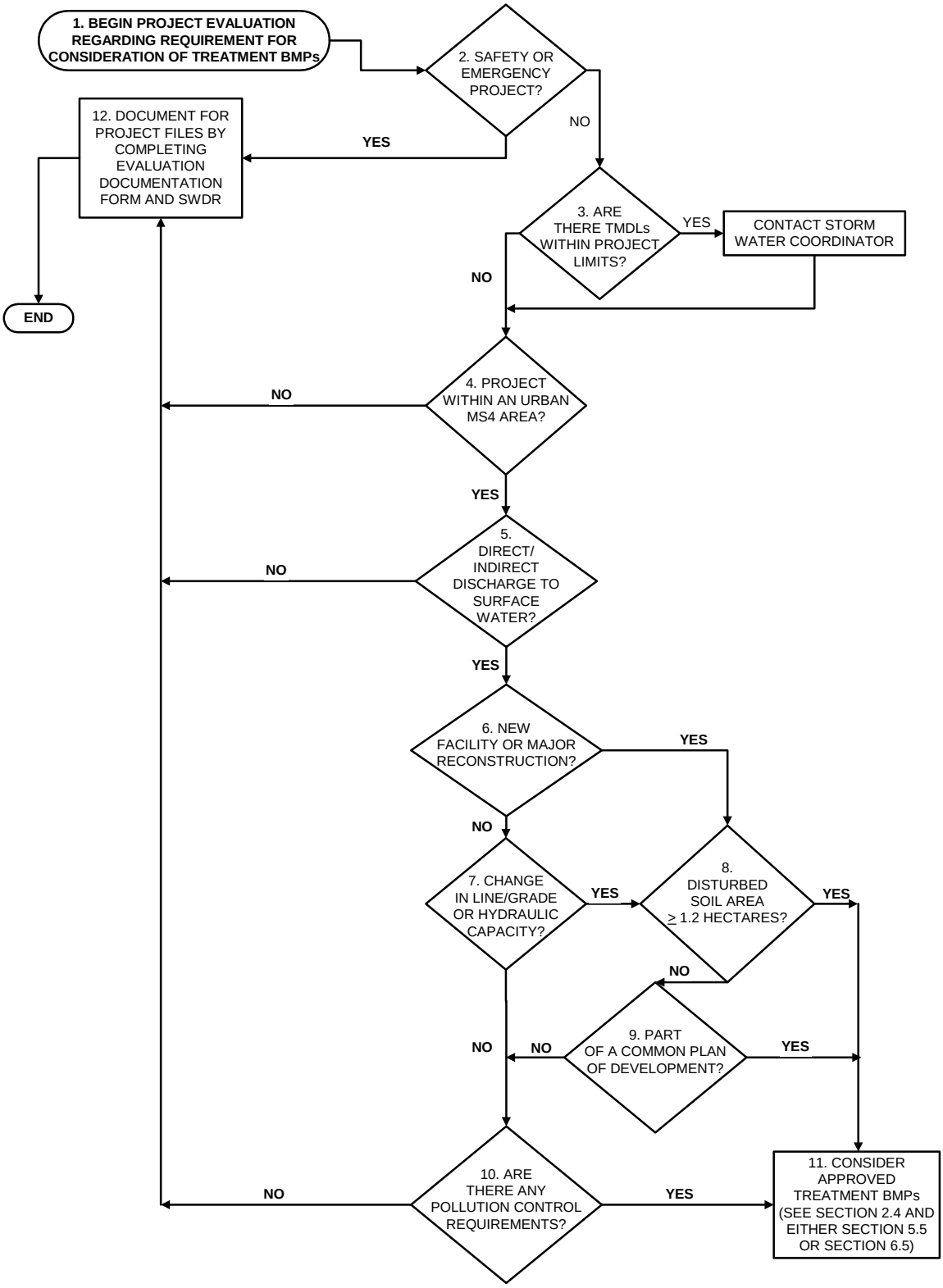
Certain Departmental projects are considered Emergency and/or Safety projects. Safety projects are funded out of the SHOPP 010 Program and must meet specific criteria for this designation. Also, throughout the year conditions may arise that require Caltrans to conduct emergency projects to protect public health, safety and property.

Conditions during the safety and/or emergency projects result in Caltrans being exempt from the requirement to implement Treatment BMPs, due to the fact that adding Treatment BMPs could jeopardize the funding and expedient delivery of the project.

These projects may be retrofitted with Treatment BMPs after the objective to restore public health, safety and property has been completed.

Regardless of whether the project falls under an emergency or safety project status, Design Pollution Prevention and Construction Site BMPs need to be included in project design.

Figure 4-1: Project Evaluation Process for Consideration of Permanent Treatment BMPs



Step 3 – Have TMDLs been established with project limits?

All new construction and major reconstruction projects that discharge into a receiving water for which a TMDL has been established must consider treatment BMPs.

- If a receiving water has a TMDL established, coordinate directly with your Region or District Storm Water Coordinator

Step 4 – Is the project within an urban area subject to an MS4 permit?

Projects and activities within urban areas subject to MS4 permits may require the consideration of incorporating Permanent Treatment BMPs

Step 5 - Is the project directly or indirectly discharging to Surface Waters?

Surface Waters are known as Waters of the United States and/or Waters of the State. In general, these include creeks, streams, rivers, oceans, reservoirs, wetlands, estuaries and lakes.

A direct discharge means a discharge of surface runoff directly to the surface water body without first flowing through a municipal separate storm sewer system (MS4). An indirect discharge means the discharge of surface runoff to the surface water body through an MS4 storm water conveyance system, unlisted tributary to the surface water, or a storm water discharge that otherwise reaches the water body.

If a project directly or indirectly discharges to surface water, the Project Engineer (PE) should consider the additional evaluation criteria in the decision tree, step numbers 3-12. If not, the project is not required to consider the incorporation of Treatment BMPs, and the PE should prepare the appropriate documentation to be attached to the Storm Water Data Report (SWDR).

Step 6 - Is this a new facility or major reconstruction?

New construction and major reconstruction includes new routes, route alignments, and route upgrades. New construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety.

Consideration of Treatment BMPs and capacity to treat storm water runoff from the impervious areas within the Caltrans right-of-way is required in the design of new facilities and major reconstruction. These projects may include, but are not limited to:

- New highways and freeways;
- Highway-related facilities, including new or reconstructed maintenance facilities, safety roadside rest areas, toll plazas and inspection and weigh stations;
- Adding one or more lanes;
- Adding HOV lanes
- Construction activities conducted within highway rights-of-way in conjunction with a new facility;

- New or reconstructed interchanges, including on-ramps, off-ramps, and connectors;
- New or reconstructed bridges;
- Tunnels; and
- Drainage system improvements, including changes to pipes, conduits, channels, etc.

Projects containing the elements listed in this section are classified as new facilities or major reconstruction for storm water purposes.

Step 7 - Is there a change in line/grade or hydraulic capacity?

Projects that propose a change to the original line, grade, hydraulic capacity, or original purpose of the facility may be required to consider permanent Treatment BMPs. Changes to line, grade or hydraulic capacity include any changes made within the project limits that would alter the hydrologic/hydraulic behavior of storm water discharges. The following changes would be considered a change in line, grade or hydraulic capacity:

- A change in the time of concentration, peak flow, volume or velocity of storm water discharges;
- Modifying or creating new drainage ditches, swales, culverts, or storm drain facilities; or
- Changing historic drainage patterns.

Modifying drainage ditches, swales, culverts, or storm drain facilities does not include repairs or grading to re-establish the original line, grade or hydraulic capacity of a ditch or swale, nor does it include minor improvements such as adding culvert flared end sections, energy dissipation, or replacing pipe sections "in-kind."

Examples of activities that would not be considered a change in line, grade or hydraulic capacity include:

- Overlaying a roadway surface;
- Re-grading a ditch to the original line and grade;
- Culvert lining; or
- Replacing a culvert in-kind.

Step 8 - Is the disturbed soil area greater than or equal to 1.2 hectares?

Projects that will disturb soil area of 1.2 hectares (3 acres) or more in locations that have a change in line or grade must consider incorporating approved Treatment BMPs. The District/Regional National Pollutant Discharge Elimination System (NPDES) Storm Water Coordinator should be consulted if there is any ambiguity or question regarding the determination of the extent of the disturbed area or the applicable Treatment BMPs. The 1.2-hectare (3 acre) threshold for determining Treatment BMP exemption is independent from the 0.4-hectare threshold for when SWPPPs are required.

Step 9 - Is the project part of a Common Plan of Development?

Projects that will disturb less than 1.2 hectares (3 acres) but are part of a larger Common Plan of Development whose total land disturbing activities disturb 1.2 hectares (3 acres) or more must consider Treatment BMPs. In addition, projects designated as part of a Common Plan of Development by the permitting authority must also consider Treatment BMPs. A Common Plan of Development is broadly defined as any announcement on a piece of documentation or physical demarcation indicating that construction activities may occur on a specific plot. This requirement remains in effect regardless of any lapse in time between the initial grading or clearing of the area and the actual construction on a portion of the land that was graded.

Step 10 - Are there Pollution Control Requirements?

Pollution Control Requirements include, but are not limited to Basin Plan requirements, established TMDLs, 303(d) listings and numeric effluent limits.

Contact your Region or District Storm Water Coordinator to determine if there are any Pollution Control Requirements within the project limits.

Step 11 - Consider Approved Treatment BMPs

Checklist T-1 provides guidance on which Treatment BMPs to consider. The Checklist also contains design questions that lead the designer through an evaluation of each approved Treatment BMP. Decision Tree T-1 is to be used in conjunction with Checklist T-1 and is used to identify which Treatment BMPs to consider. See Section 2.4 and either Section 5.5 or Section 6.5. Also refer to Checklist T-1 and Decision Tree T-1 in Appendix E.

Step 12 - Document for Project Files

All supporting data used to determine whether a project must consider incorporating Treatment BMPs should be summarized in tabular form for inclusion in the Project Files. A copy of the completed Evaluation Documentation Form and the tabulated supporting data shall be attached to the Storm Water Data Report (SWDR).

If Treatment BMPs are determined not to be necessary, permanent Design Pollution Prevention BMPs and Construction Site BMPs shall still be considered.

For the following BMPs, design guidelines are in the process of development. In the interim, refer to the *BMP Retrofit Pilot Project Final Report* (California Department of Transportation, January 2004) and your District NPDES Coordinator. This applies to Multi-Chamber Treatment Trains, Media Filters and Wet Basin.

** When in District 7, use Figure 32 from the "*Infiltration Basin Siting Study, Vol. 1*" (California Department of Transportation, June 2003) when evaluating for infiltration Basins.